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TITLE: Silica materials

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## INVENTOR-INFORMATION:

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US-CL-CURRENT: 428/34.4; 210/506, 210/510.1, 428/36.91, 428/402, 428/406, 428/428,  
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## CLAIMS:

What is claimed:

1. A continuous mass of silica material having surfaces defining an interior, said interior comprising interior silicon atoms, wherein at least a portion of the interior silicon atoms is bonded to a substituted or unsubstituted alkyl moiety having from 6 to 32 carbon atoms.
2. A continuous mass of silica material according to claim 1, wherein about 1% to 100% of the interior silicon atoms are bonded to the alkyl moiety.
3. A continuous mass of silica material according to claim 1, wherein said surfaces comprise surface silicon atoms with at least a portion of the surface silicon atoms being bonded to the alkyl moiety.
4. A continuous mass of silica material according to claim 3, wherein about 1% to about 100% of the surface silicon atoms are bonded to the alkyl moiety.
5. A continuous mass of silica material according to claim 3, wherein the alkyl moiety is a substituted alkyl moiety.
6. A continuous mass of silica material according to claim 5, wherein the alkyl moiety contains one or more functional groups selected from the group consisting of an alcohol, an amine, a carboxylic acid, a thiol, an ester, and an amide.
7. A continuous mass of silica material according to claim 1, wherein the alkyl moiety is an unsubstituted alkyl moiety.
8. A continuous mass of silica material according to claim 7, wherein the alkyl moiety has the formula:  
(CH.sub.2).sub.m CH.sub.3  
wherein  
m is from 5 to 31.
9. A continuous mass of silica material according to claim 8, wherein m is 7.
10. A continuous mass of silica material according to claim 1, wherein the continuous mass of silica material is a particle having a diameter from about 0.3 .mu.m to about 500 .mu.m.
11. A continuous mass of silica material according to claim 1, wherein the continuous mass of silica material is a film bonded to a substrate.
12. A continuous mass of silica material according to claim 11, wherein the substrate is glass having surface siloxy groups.
13. A continuous mass of silica material according to claim 11, wherein the substrate is a glass capillary tube's inner surface.
14. A continuous mass of silica material according to claim 11, wherein the film has a thickness of from about 1 nm to about 100 nm.
15. A continuous mass of silica material according to claim 1, wherein said continuous mass of silica material is an aerogel.
16. A continuous mass of silica material according to claim 15, wherein the continuous mass of silica material substantially fills a glass capillary tube and

is bonded to the glass capillary tube's inner surface.

17. A glass particle having a diameter of from about 0.3  $\mu\text{m}$  to about 500  $\mu\text{m}$  and having a surface defining an interior, said interior comprising interior silicon atoms, wherein at least a portion of the interior silicon atoms is bonded to a substituted or unsubstituted alkyl moiety.

18. A glass particle according to claim 17, wherein the substituted or unsubstituted alkyl moiety contains from 6 to 32 carbon atoms.

19. A glass particle according to claim 17, wherein the surface comprises surface silicon atoms with at least a portion of the surface silicon atoms being bonded to the alkyl moiety.

20. A glass particle according to claim 17, wherein the alkyl moiety is unsubstituted and has the formula:

$(\text{CH}_{\text{sub.2}})_{\text{sub.m}} \text{CH}_{\text{sub.3}}$

wherein

m is from 5 to 31.

21. A glass particle according to claim 20, wherein m is 7.

22. A composite glass article comprising:

a glass tube having an inner wall defining an inner cylindrical space and one or more continuous masses of silica material according to claim 1 covalently bonded to the inner wall of said glass tube.

23. A composite glass article according to claim 22, wherein the surfaces of the one or more continuous masses of silica material comprise surface silicon atoms, at least a portion of which is bonded to the alkyl moiety.

24. A composite glass article according to claim 22, wherein the alkyl moiety is unsubstituted and has the formula:

$(\text{CH}_{\text{sub.2}})_{\text{sub.m}} \text{CH}_{\text{sub.3}}$

wherein

m is from 5 to 31.

25. A composite glass article according to claim 24, wherein m is 7.

26. A composite glass article according to claim 22, wherein the one or more continuous masses of silica material are aerogels which substantially fill the inner cylindrical space.